$I_{it}^{G,Vestek}$ is an issue selection for sector i and period t, $S_{it}^{G,Vestek}$ is a sector selection for sector i and period t, and

$$\frac{1+R}{1+\overline{R}} = \prod_{t=1}^{T}\prod_{i=1}^{N}(1+I_{it}^{G,Vestek})(1+S_{it}^{G,Vestek}), \text{ where}$$

$\frac{1+R}{1+\overline{R}}$ is the portfolio performance.

REMARKS:

Claims 9-12 have been objected to under 37 CFR 1.75 as being "a substantial duplicate of claims 1-4." For the following reasons, Applicant respectfully contends that claims 9-12, as amended, are not substantial duplicates of claims 1-4.

Amended claim 9, unlike claim 1, recites generation of data indicative of $(A + \alpha_t)(I_{it}^{A} + S_{it}^{A})$, for each value of i in the range $1 \leq i \leq T$ and each value of t in the range $1 \leq t \leq N$. Amended claim 12, unlike claim 4, recites generation of data indicative of $(1 + I_{it}^{G,Vestek}) + (1 + S_{it}^{G,Vestek})$ for each value of i in the range $1 \leq i \leq T$ and each value of t in the range $1 \leq t \leq N$. Each of claims 9-12, as amended, is limited to include the steps of generating data of a specified type and processing the data to generate other data of another specified type.

Claims 1-3, 5, 7, and 9-11 stand rejected under 35 U.S.C. 101 as being "unsupported by either an asserted utility or a well established utility." The basis for the rejection is that the coefficients A and α_t in these claims are calculated based on a known value of portfolio performance $(R - \overline{R})$ whereas the Examiner contends that "the main subject matter claimed is determining the portfolio performance $R - \overline{R}$ based on the coefficients A and α_t."

In response, Applicant respectfully notes that when practicing the claimed invention, it is true that the portfolio performance $(R - \overline{R})$ is known *a priori*. However, what is not known *a priori* is how to express the portfolio performance in a manner that accurately attributes the portfolio performance to various effects resulting

from active decisions by the portfolio manager. The invention of claims 1-3, 5, 7, and 9-12 achieves the useful, tangible, and concrete result of expressing the portfolio performance as a sum of terms of form $C_t(I_{it}^A + S_{it}^A)$, where I_{it}^A is an issue selection for sector i and period t, S_{it}^A is a sector selection for sector i and period t, and C_t is a coefficient that is determined (in accordance with the invention) so as to cause the sum to match the portfolio performance accurately. The issue selection I_{it}^A usefully measures how well the portfolio manager picked overperforming securities in sector i during period t. The sector selection S_{it}^A usefully determines the extent to which the manager overweighted the outperforming sectors. It had not been known prior to the invention how to express portfolio performance accurately as a sum of such terms.

Applicant respectfully contends that one of ordinary skill in the art can implement the claimed invention without an undue amount of effort or experimentation, in view of the teaching of the application's specification. One of ordinary skill in the art will appreciate that the portfolio performance ($R - \overline{R}$) is known *a priori* but that the invention achieves the useful, tangible, and concrete result of expressing the portfolio performance as a sum of terms of the type described in the previous paragraph.

Claims 1, 4-9, and 12 stand rejected under 35 U.S.C. 112, second paragraph, as being indefinite. In response, Application respectfully contends for the following reasons that the claims, as amended, satisfy the requirements of 35 U.S.C. 112.

Claims 4, 6, 8, and 12, as amended, explicitly define the values R_t and $\overline{R}_t$ noted by the Examiner.

The coefficient A (recited in claims 1, 5, 7, and 9) can assume any value. As explained in the specification (for example with reference to equation (12)), the coefficient A preferably has a value that corresponds to the characteristic scaling that arises from geometric compounding (i.e., the scaling between the single period active returns and the corresponding multiple period active return). This allows the invention to express accurately portfolio performance as a sum of terms of form $C_t(I_{it}^A + S_{it}^A)$, as

described above. Unless a preferred value of A (e.g., the value recited in dependent claim 2) is chosen, then the standard deviation of the recited coefficients $(A+\alpha_t)$ is not guaranteed to be small. It is precisely the smallness of this deviation that ensures the accuracy of the inventive technique. By using the recited values of coefficients α_t, the claimed invention minimizes the standard deviation of coefficients $(A+\alpha_t)$ about any value of A, but the use of a preferred value of A (e.g., that recited in claim 2) ensures that the invention accurately expresses portfolio performance as a sum of terms of form $C_t(I_{it}^A + S_{it}^A)$, as described above.

For the foregoing reasons, Applicant respectfully requests reconsideration and allowance of claims 1-12, as amended.

Respectfully submitted,

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APPENDIX

4. (Amended) A geometric performance attribution method for determining portfolio performance, relative to a benchmark, over multiple time periods t, where t varies from 1 to T, comprising the steps of:

determining attribution effects for issue selection $(1 + I_{it}^{G,Vestek})$ given by

$$1 + I_{it}^{G,Vestek} = \left(\frac{1 + w_{it} r_{it}}{1 + w_{it} \bar{r}_{it}}\right) \Gamma_t$$

and determining attribution effects for sector selection $(1 + S_{it}^{G,Vestek})$ given by

$$1 + S_{it}^{G,Vestek} = \left(\frac{1 + w_{it} \bar{r}_{it}}{1 + \bar{w}_{it} \bar{r}_{it}}\right)\left(\frac{1 + \bar{w}_{it} \bar{R}_t}{1 + w_{it} \bar{R}_t}\right) \Gamma_t ,$$

where the values of Γ_t are

$$\Gamma_t = \left[\left(\frac{1 + R_t}{1 + \bar{R}_t}\right) \prod_{j=1}^{N} \frac{(1 + \bar{w}_{jt} \bar{r}_{jt})(1 + w_{jt} \bar{R}_t)}{(1 + w_{jt} r_{jt})(1 + \bar{w}_{jt} \bar{R}_t)}\right]^{\frac{1}{2N}},$$

where r_{jt} is a portfolio return for sector j for period t, $\bar{r}_{jt}$ is a benchmark return for sector j for period t, w_{jt} is a weight for r_{jt}, $\bar{w}_{jt}$ is a weight for $\bar{r}_{jt}$, R_t is a portfolio return for period t, $\bar{R}_t$ is a benchmark return for period t, R is determined by

$$R = [\prod_{t=1}^{T} (1 + R_t)] - 1$$

and $\bar{R}$ is determined by

$$\bar{R} = [\prod_{t=1}^{T} (1 + \bar{R}_t)] - 1 ;$$

and determining the portfolio performance as

$$\frac{1 + R}{1 + \bar{R}} = \prod_{t=1}^{T} \prod_{i=1}^{N} (1 + I_{it}^{G,Vestek})(1 + S_{it}^{G,Vestek}) .$$

6. (Amended) A computer system, comprising:

a processor programmed to perform a geometric performance attribution computation to determine portfolio performance, relative to a benchmark, over multiple time periods t, where t varies from 1 to T, by determining attribution effects for issue selection $(1 + I_{it}^{G,Vestek})$ given by

$$1 + I_{it}^{G,Vestek} = \left(\frac{1 + w_{it} r_{it}}{1 + w_{it} \bar{r}_{it}}\right) \Gamma_t$$

and determining attribution effects for sector selection $(1 + S_{it}^{G,Vestek})$ given by

$$1 + S_{it}^{G,Vestek} = \left(\frac{1 + w_{it} \bar{r}_{it}}{1 + \bar{w}_{it} \bar{r}_{it}}\right)\left(\frac{1 + \bar{w}_{it} \bar{R}_t}{1 + w_{it} \bar{R}_t}\right) \Gamma_t,$$

where the values of Γ_t are,

$$\Gamma_t = \left[\left(\frac{1 + R_t}{1 + \bar{R}_t}\right) \prod_{j=1}^{N} \frac{(1 + \bar{w}_{jt} \bar{r}_{jt})(1 + w_{jt} \bar{R}_t)}{(1 + w_{jt} r_{jt})(1 + \bar{w}_{jt} \bar{R}_t)}\right]^{\frac{1}{2N}},$$

where r_{jt} is a portfolio return for sector j for period t, $\bar{r}_{jt}$ is a benchmark return for sector j for period t, w_{jt} is a weight for r_{jt}, $\bar{w}_{jt}$ is a weight for $\bar{r}_{jt}$, R_t is a portfolio return for period t, $\bar{R}_t$ is a benchmark return for period t, R is determined by

$$R = [\prod_{t=1}^{T} (1 + R_t)] - 1$$

and $\bar{R}$ is determined by

$$\bar{R} = [\prod_{t=1}^{T} (1 + \bar{R}_t)] - 1;$$

and determining the portfolio performance as

$$\frac{1 + R}{1 + \bar{R}} = \prod_{t=1}^{T} \prod_{i=1}^{N} (1 + I_{it}^{G,Vestek})(1 + S_{it}^{G,Vestek});$$

and

a display device coupled to the processor for displaying a result of the geometric performance attribution computation.

8. (Amended) A computer readable medium which stores code for programming a processor to perform a geometric performance attribution computation to determine portfolio performance, relative to a benchmark, over multiple time periods t, where t varies from 1 to T, by determining attribution effects for issue selection $(1 + I_{it}^{G,Vestek})$ given by

$$1 + I_{it}^{G,Vestek} = \left(\frac{1 + w_{it} r_{it}}{1 + w_{it} \bar{r}_{it}}\right) \Gamma_t$$

and determining attribution effects for sector selection $(1 + S_{it}^{G,Vestek})$ given by

$$1 + S_{it}^{G,Vestek} = \left(\frac{1 + w_{it} \bar{r}_{it}}{1 + \bar{w}_{it} \bar{r}_{it}}\right)\left(\frac{1 + \bar{w}_{it} \bar{R}_t}{1 + w_{it} \bar{R}_t}\right) \Gamma_t ,$$

where the values of Γ_t are,

$$\Gamma_t = \left[\left(\frac{1 + R_t}{1 + \bar{R}_t}\right) \prod_{j=1}^{N} \frac{(1 + \bar{w}_{jt} \bar{r}_{jt})(1 + w_{jt} \bar{R}_t)}{(1 + w_{jt} r_{jt})(1 + \bar{w}_{jt} \bar{R}_t)}\right]^{\frac{1}{2N}},$$

where r_{jt} is a portfolio return for sector j for period t, $\bar{r}_{jt}$ is a benchmark return for sector j for period t, w_{jt} is a weight for r_{jt}, $\bar{w}_{jt}$ is a weight for $\bar{r}_{jt}$, R_t is a portfolio return for period t, $\bar{R}_t$ is a benchmark return for period t, R is determined by

$$R = [\prod_{t=1}^{T} (1 + R_t)] - 1$$

and $\bar{R}$ is determined by

$$\bar{R} = [\prod_{t=1}^{T} (1 + \bar{R}_t)] - 1 ;$$

and determining the portfolio performance as

$$\frac{1 + R}{1 + \bar{R}} = \prod_{t=1}^{T} \prod_{i=1}^{N} (1 + I_{it}^{G,Vestek})(1 + S_{it}^{G,Vestek}).$$

9. (Amended) An arithmetic performance attribution method for determining portfolio performance, relative to a benchmark, over multiple time periods t, where t varies from 1 to T, comprising the steps of:

generating data indicative of coefficients $(A + \alpha_t)$, where the values α_t are defined as

$$\alpha_t = \left[\frac{R - \bar{R} - A \sum_{k=1}^{T} (R_k - \bar{R}_k)}{\sum_{k=1}^{T} (R_k - \bar{R}_k)^2}\right](R_t - \bar{R}_t),$$

where R_t is a portfolio return for period t, $\bar{R}_t$ is a benchmark return for period t, R is determined by

$$R = [\prod_{t=1}^{T}(1+R_t)]-1,$$

and $\overline{R}$ is determined by

$$\overline{R} = [\prod_{t=1}^{T}(1+\overline{R}_t)]-1; \text{ and}$$

processing the data indicative of coefficients $(A+\alpha_t)$ to generate data indicative of $(A+\alpha_t)(I_{it}^A + S_{it}^A)$, for each value of i in the range $1 \leq i \leq$ T and each value of t in the range $1 \leq t \leq$ N, where I_{it}^A is an issue selection for sector i and period t, S_{it}^A is a sector selection for sector i and period t, and

$$R - \overline{R} = \sum_{t=1}^{T}\sum_{i=1}^{N}(A+\alpha_t)(I_{it}^A + S_{it}^A) \text{ [,}$$

where $R-\overline{R}$ is the portfolio performance, I_{it}^A is an issue selection for sector i and period t, and S_{it}^A is a sector selection for sector i and period t].

12. (Amended) A geometric performance attribution method for determining portfolio performance, relative to a benchmark, over multiple time periods t, where t varies from 1 to T, comprising the steps of:

generating data indicative of attribution effects for issue selection $(1+I_{it}^{G,Vestek})$ defined as

$$1+I_{it}^{G,Vestek} = \left(\frac{1+w_{it}r_{it}}{1+w_{it}\overline{r}_{it}}\right)\Gamma_t$$

and generating data indicative of attribution effects for sector selection $(1+S_{it}^{G,Vestek})$ defined as

$$1+S_{it}^{G,Vestek} = \left(\frac{1+w_{it}\overline{r}_{it}}{1+\overline{w}_{it}\overline{r}_{it}}\right)\left(\frac{1+\overline{w}_{it}\overline{R}_t}{1+w_{it}\overline{R}_t}\right)\Gamma_t,$$

where R_t is a portfolio return for period t, $\overline{R}_t$ is a benchmark return for period t, and the values of Γ_t are

$$\Gamma_t = \left[\left(\frac{1+R_t}{1+\overline{R}_t}\right)\prod_{j=1}^{N}\frac{(1+\overline{w}_{jt}\overline{r}_{jt})(1+w_{jt}\overline{R}_t)}{(1+w_{jt}r_{jt})(1+\overline{w}_{jt}\overline{R}_t)}\right]^{\frac{1}{2N}},$$

where r_{jt} is a portfolio return for sector j for period t, $\bar{r}_{jt}$ is a benchmark return for sector j for period t, w_{jt} is a weight for r_{jt}, $\bar{w}_{jt}$ is a weight for $\bar{r}_{jt}$, R is determined by

$$R = [\prod_{t=1}^{T}(1 + R_t)] - 1$$

and $\bar{R}$ is determined by

$$\bar{R} = [\prod_{t=1}^{T}(1 + \bar{R}_t)] - 1 \text{; and}$$

processing the data indicative of attribution effects for issue selection $(1 + I_{it}^{G,Vestek})$ and processing the data indicative of attribution effects for sector selection $(1 + S_{it}^{G,Vestek})$ to generate data indicative of $(1 + I_{it}^{G,Vestek}) + (1 + S_{it}^{G,Vestek})$, for each value of i in the range $1 \leq i \leq T$ and each value of t in the range $1 \leq t \leq N$, where $I_{it}^{G,Vestek}$ is an issue selection for sector i and period t, $S_{it}^{G,Vestek}$ is a sector selection for sector i and period t, and

$$\frac{1+R}{1+\bar{R}} = \prod_{t=1}^{T}\prod_{i=1}^{N}(1 + I_{it}^{G,Vestek})(1 + S_{it}^{G,Vestek}) \text{, where}$$

$\frac{1+R}{1+\bar{R}}$ is the portfolio performance.